

CLAIMS

What is claimed is:

1. An accurate blending module for retrofitting existing laboratory or industrial systems comprising:

- 10 a) a proportioning submodule adapted to receive and merge at least two liquid feeds;
- b) a blending submodule in communication with the proportioning submodule, said
blending submodule blending a merged liquid stream received from the
proportioning submodule;
- c) a detection submodule in communication with the blending submodule so that a
15 blended liquid stream from the blending submodule flows therethrough, said
detection submodule detecting a characteristic of the blended liquid stream;
- d) a controller in communication with the detection submodule so that the
characteristic of the blended liquid stream may be received therefrom,
- e) said controller also in communication with the proportioning submodule and
20 adjusting the proportioning submodule based upon the detected characteristic;
- f) physical integration of the proportioning, blending and detection submodules; and
- g) means for connecting the accurate blending module to the existing laboratory or
industrial system.

25 2. The accurate blending module of claim 1 wherein the integration of the submodules is onto a skid that is provided with rollers so that the skid may be rolled across a surface.

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3. The accurate blending module of claim 1 further comprising a purge valve in communication with an outlet of the detection submodule, said purge valve in communication with the controller so that said controller opens the purge valve when the detected characteristic exceeds a predetermined tolerance.

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4. The accurate blending module of claim 1 wherein the controller includes a programmable logic controller.

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5. The accurate blending module of claim 1 wherein the controller includes a personal computer.

6. The accurate blending module of claim 1 wherein the blending submodule includes a pump.

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7. The accurate blending module of claim 1 wherein the controller also communicates with the blending submodule.

8. The accurate blending module of claim 1 wherein the proportioning submodule includes a valve.

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9. The accurate blending module of claim 1 wherein the blending submodule includes an in-line mixer.

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10. The accurate blending module of claim 1 wherein the blending submodule includes a recirculating mixer.

10 11. The accurate blending module of claim 1 wherein the blending submodule includes a fixed volume.

12. The accurate blending module of claim 1 wherein the blending submodule includes a bubbletrap.

15 13. The accurate blending module of claim 1 wherein the detection submodule includes an ultraviolet sensor.

14. The accurate blending module of claim 1 wherein the detection submodule includes an conductivity sensor.

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15. The accurate blending module of claim 1 wherein the detection submodule includes a near infrared sensor.

25 16. The accurate blending module of claim 1 wherein the detection submodule includes a pH sensor.

17. A method for providing a blended liquid stream to a laboratory or industrial system including the steps of:

- a) providing an accurate blending module having a proportioning submodule, a blending submodule, a detection submodule and a controller;
- 10 b) connecting at least two liquid feeds to the accurate blending module;
- c) connecting the accurate blending module to the existing laboratory or industrial system;
- d) merging the two liquid feeds with the proportioning submodule of the accurate blending module so that a merged liquid stream is produced;
- 15 e) blending the merged liquid stream with the blending submodule of the blending module of the accurate blending module so that a blended liquid stream is produced;
- f) detecting a characteristic of the blended liquid stream and generating a corresponding signal with the detection submodule of the accurate blending module; and
- 20 g) receiving the signal with the controller and adjusting the proportioning submodule with the controller based upon the received signal.

18. The method of claim 17 wherein the blending is accomplished to 0.4% or better
25 accuracy.

19. A module for blending liquids comprising:

- a) a proportioning submodule adapted to receive and merge at least two liquid feeds;
- b) a blending submodule in communication with the proportioning submodule, said
10 blending submodule blending a merged liquid stream received from the
proportioning submodule;
- c) a detection submodule in communication with the blending submodule so that a
blended liquid stream from the blending submodule flows therethrough, said
detection submodule detecting a characteristic of the blended liquid stream;
- 15 d) a controller in communication with the detection submodule so that the
characteristic of the blended liquid stream may be received therefrom; and
- e) said controller also in communication with the proportioning submodule and
adjusting the proportioning submodule based upon the detected characteristic to
within 0.4% of a predetermined value.

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20. The accurate blending module of claim 19 further comprising a purge valve in
communication with an outlet of the detection submodule, said purge valve in communication
with the controller so that said controller opens the purge valve when the detected characteristic
exceeds a predetermined tolerance.

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